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PLANT COVER, SOIL TEMPERATURE, FREEZE, WATER STRESS, AND
EVAPOTRANSPIRATION CONDITIONS

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TYPE II Quarterly Progress Report
for Period December 1, 1978 to March 1, 1979

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TYPE II QUARTERLY PROGRESS REPORT

December 1, 1978 to March 1, 1979

A. Problems:

We are still awaiting delivery of data products.

B. Accomplishments:1. Aircraft support mission.

Photographic products delivered from the aircraft support flight of January 22, 1979, have been delivered. Freeze damage to citrus in the Mission area shows up well; that is, the relative appearance of different groves shows that some are damaged worse than others. Cloud-free conditions existed from Weslaco westward, but flight lines were not completed all the way to the coast because of complete or nearly complete cloud cover.

2. Weather station network.

The weather-station network in the HCMM test site (including a rangeland station established especially for this study) has been increased to 24 locations. A computerized technique has been developed to extract the satellite-observed surface temperatures surrounding each weather station, of areas ranging from one to eighty-one (9 x 9 matrix) 20-second elements (20-second longitude x 20-second latitude). The computer program provides a surface temperature map of the area surrounding each station and plots the frequency distribution of various temperature intervals for the 9 x 9 matrices.

3. Synoptic study sites increased.

The areas selected for synoptic surface temperature analysis have been increased to 48 in number. They range from the Gulf of Mexico to 240 km inland representing water, irrigated and nonirrigated agriculture, natural vegetation, improved rangeland, and urban areas. A computerized procedure produces temperature maps of the areas and determines the frequency distribution of temperature intervals in the manner mentioned above.

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4. Vegetative cover analyses augmented by Landsat data.

HCMM data consists of thermal and visible bands, but the reflective infrared band is superior for assessing vegetative ground cover or green biomass. Thus, in order to relate surface temperature to vegetative ground cover at more sites than we could ground truth, we have acquired the Landsat-2 digital tape for June 15, 1978 and the Landsat-3 digital tape for July 12, 1978. The digital counts for each large citrus grove and cotton, sorghum, or sugarcane field that was ground truthed is being extracted. When we receive the HCMM thermal tapes, we will pair the temperatures extracted for the same fields with the perpendicular vegetation indexes (PVI) of the Landsat data. The relationships determined for these training fields can then be applied to other fields or sites that weren't ground truthed, and interpretations can be made for them about the effect of vegetative cover on surface temperature.

5. Priority data identified.

We have worked with our contract monitor and established priority status for two time periods of high interest. They are the nighttime coverages of Jan. 3 and 4, 1979, when a severe freeze occurred; and daytime coverages for 6/6/78, 6/12/78, 6/23/78, 7/3/78, and 7/9/78, a period when we were documenting vegetative cover, irrigation dates, and plant growth stages in a set of fields.

We are studying our tabulation of HCMM overpass dates versus recorded insolation and precipitation for each day of the year. From this study, we'll identify other dates of high priority.

We have arranged with our contract monitor for the Information Processing Facility at Goddard to process only scenes we specify, and not to do any routine processing. This will eliminate the processing of scenes that are unusable because of cloud conditions or that are low priority because antecedent weather (continued drought, continued rain) or ground conditions remained the same.

C. Significant Results:

None.

D. Publications:

None.

E. Recommendations:

None.

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F. Funds Expended:

Allotment for FY 78 - - - - -	\$45,240
Allotment for FY 79 - - - - -	<u>59,760¹</u>
Total	105,000
Location and Indirect PROGRAM Costs - - - - -	24,200 ²
Other costs through March 1, 1979:	
Salaries - - - - -	33,595
Travel & Trans. of Persons - - - - -	4,441
Transportation of Things - - - - -	21
Services & Supplies - - - - -	<u>6,914³</u>
Equipment - - - - -	<u>3,240</u>
Total	72,411
Balance	\$32,589

- ¹ Last report showed an amount of \$50,000. This amount adjusted by region on Transaction Ledger.
- ² Due to typing error on last report this amount has been adjusted to reflect correct costs incurred.
- ³ Due to a bookkeeping error, the total amount of supplies and services was not calculated correctly last time. The present figure reflects the correct expenditures to date.

G. Data Utility:

The photography from the Jan. 22, 1979, aircraft support mission is excellent in quality and indicates citrus orchard to orchard variations in amount of freeze damage received from the freeze on Jan. 2 and 3, 1979.

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